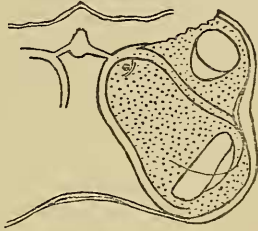


anteriorly. The anterior margin of the eye-plate extends in front of the eye-capsules, very obtusely pointed in the centre; posterior margin widely and very shallowly emarginate. Very characteristic is the small oval muscle-attachment, which is connected by a very narrow chitinous band with the

Fig. 10.



rim of the eye-capsules. The latter are notably wider in front than behind; sinuate on both the inner and outer margins; lenses large and of the usual shape.

The capitulum is broadly built, length of the maxillary plate about .58 millim. Seen from the front the lateral and distal margins are only moderately emarginate; side-processes short, curved sharply inwards at their apices. The pharynx greatly resembles that of *E. infundibulifera*, var. *stagnalis* (see fig. 9a) in outline. Air-tubes shorter than the pharynx.

The palps are about 1.75 millim. in length. Second segment with 4 or 5 feathered spines on the distal margin and a group of four more on the extreme inner corner. Third segment with about 20 long strongly feathered spines in the vicinity of the inner distal corner, which is moderately developed. Fourth with many long bristle-like hairs grouped towards the inner margin, becoming more numerous at the distal end of the segment, many feathered.

*Locality.* Found in Ballynahinch Lake, County Galway, by Mr. W. F. de V. Kane, June 1900.

---

LI.—*Remarks upon the Morphology and Systematics of certain Chilognathous Diplopods.* By R. I. Pocock.

I.—ON THE TERMINOLOGY AND EVOLUTION OF THE GONOPODS AND OF THE PENIS.

THE modified appendages of the seventh segment in the males of the Helminthomorphous Diplopods are commonly spoken of as "pedes copulativi," "gonopods," or, more

simply, as "male genitalia." These terminologies, however, do not allow for the known structural and functional differences of the parts involved in the formation of the apparatus. This apparatus is exhibited in its simplest form in the Polydesmoidea, in which only the appendages of the anterior pair of the seventh segment are converted into organs which are furnished with a seminal pouch and duct and act as carriers of the sperm and as its transmitters into the genital apertures of the female. In the Iuloid, Spiroboloid, and Spirostreptoid Chilognatha both pairs of appendages and the two sterna of the seventh segment are modified as "gonopods," and combine to form an apparatus often of extreme complexity. But however complicated it be, its constituents are primarily resolvable into two parts, namely, the posterior appendage, bearing the seminal pouch and duct, and the anterior appendage, which forms a protective case or sheath for the former. The appendages bearing the seminal pouch and duct, whether they be the anterior or the posterior pair of the seventh segment, are the essential elements of the apparatus, and may be appropriately called the *phallopods*. The accessory appendages constituting the sheath may similarly be called the *coleopods*. Amongst existing Chilognaths the simplest types of gonopods of the compound kind are found in the Colobognatha, where both coleopods and phallopods are modified to a relatively slight extent. The phallopods are furnished apically with a tuft of bristles, but seem to be unprovided with seminal pouch and duct. It is probable that we have here a primitive condition in which this appendage was modified to hold a drop of sperm or a spermatophore—a purpose for which the arrow-headed bristles described by Brölemann in *Brachycybe Lecontei* and *Platydesmus guatemalensis* (Mém. Soc. Zool. Fr. 1900, pp. 109–113, pl. vii. figs. 76 & 82) seem well fitted. In any case, the physiological importance of these bristles is proved by the protection they receive from the modification as coleopods of the appendages in front of them.

It may be assumed that the formation of true phallopods with internal seminal sacs was preceded by a stage in which the appendages were simply modified as holders and inserters of spermatophores. In that case, from a stage of development a little earlier than that presented by the Colobognatha may be derived hypothetically along independent lines the condition of things found in the three sections of Chilognatha to which Verhoeff has given the names AscospERMOPHORA, ProterospERMOPHORA, and OpisthospERMOPHORA (Zool. Jahrb.,

Syst. xiii. pp. 53-54, 1900). In the AscospERMOPHORA (Chordeumoidea) no seminal sacs have been developed within the appendages of the seventh segment, their function being performed (according to Verhoeff) by the exsertile coxal pouches of the two pairs of appendages of the eighth segment. Hence there are neither true phallopods nor coleopods. It is hard to believe that this condition has been derived from the advanced state seen in the other groups of Helminthomorpha, where genuine phallopods have been developed from the anterior or posterior pair of the seventh segment. In the Proterospermophora (Lysiopetaloidea, Polydesmoidea) phallopods resulted from the transformation of the anterior pair of the seventh segment, the posterior pair reverting to the primitive type of locomotor appendage. In the Opisthospermophora they arose from the posterior pair, the anterior pair taking on the function of coleopods, the condition characteristic of both groups being derivable from the hypothetical stage in which both pairs of the appendages in question were modified simply as spermatophore-holders.

To the Opisthospermophora belong the Iuloidea, Spirostreptoidea (sens. lat.), Spiroboloidea, and no doubt also the Stemmiuloidea. Setting aside the Spiroboloidea, these groups further resemble each other in possessing a distinct penis. In the primitive Diplopod there were probably two penes emerging behind the appendages of the second pair. They are retained as such in the Limacomorpha. In the Colobognatha they are also distinct, although united to the coxæ of the appendages, being long in the Polyzonidæ, short in the Siphonophoridæ and Platydesmidæ, where they appear as papilliform excrescences of these segments. The fusion initiated in these families is carried to an extreme in the Chordeumoidea, Lysiopetaloidea, Polydesmoidea, and Oniscoomorpha, where the penes have disappeared as independent structures, the seminal ducts perforating the coxæ of the appendages in question. In the Iuloidea and Spirostreptoidea the two penes have fused together, though the organ still shows unmistakable traces of its double origin. In the Stemmiuloidea the fusion is much more complete, all indications of the primitive double nature of the organ having disappeared, the process resulting in the formation of a long apparently bisegmented organ. The total suppression of the penis in the Spiroboloidea may be regarded as a specialized feature probably resulting from a gradual diminution in size of the small double penis such as is seen in the Spirostreptoidea. Thus it is possible to trace back all the modifications

of the penis as well as of the gonopods to a condition not very far removed antecedently from that which still persists in the Colobognatha, the condition seen in the Opisthospermophora having been evolved along one line, that seen in the Proterospermophora along another, that of the Ascospermophora along a third.

## II.—DESCRIPTIONS OF NEW FORMS.

### CHORDEUMOIDEA.

#### Genus HUTTONIELLA, nov.

Resembling the two Oriental genera *Heterochordeuma*, Poc., and *Pocockia*, Silv., in possessing thirty-two segments.

*Eyes* consisting of 25 contiguous ocelli, arranged in 5 rows of 7, 6, 5, 4, 3 each, inner row of seven, the outer of three.

*Antennæ* long and slender, third segment the longest; fourth, fifth, and sixth not very unequal in length, the fifth a little longer than either.

First *tergal plate* semicircular (fig. I. 1, p. 521); of the three setiferous tubercles on each side, the middle one is a little nearer to the inner than to the outer, which is above the lateral angle. From the first tergite backwards to the middle of the body the lateral or outer tubercle gradually increases in size to form a large tuberculiform excrescence on each side; the other tubercles are smaller and close above it, the median larger than the inner (fig. I. 1 a). Thus the three tubercles are completely lateral. In the posterior half of the body the external tubercle gradually dwindles in size and loses its prominence, the last segments, excluding the anal, being furnished with six tubercles, subequal in size and subequally spaced, arranged in a transverse row across the terga from side to side (fig. I. 1 b).

*Bristles* stout and aciculate. Segments crescentically grooved laterally.

♂. *Legs* of first, second, and third pairs unmodified; of fourth, fifth, sixth, and seventh thickened, "fleshy," with terminal segment long, arcuate, with the concavity postaxial, extremity of the fourth pair (fig. I. 1 c) ending in a small button-shaped prominence like the tip of a foil; those of the fifth and sixth pairs apically rounded, clawless; that of the seventh pair with its distal half expanded, compressed, and postaxially excavated, ending in a short stout claw (fig. I. 1 d). Coxal segments of seventh appendage (fig. I. 1 e, 1 f, 7) enlarged, produced posteriorly into an acuminate and elongate bristly process. Legs of *eighth* pair (fig. I. 1 e, 1 g, 8)

dwarfed, hyaline, terminating distally in a pair of backwardly directed processes, an outer acuminate, an inner expanded and laminate. Legs of *ninth* pair (fig. I. 1 e, 1 g, 9) terminating in an oval subglobular segment (? femur), the preceding segment (? trochanter) with a conical bristly process. On the inner side of this segment proximally may be seen two processes, one longer and curving inwards and then forwards, the other shorter, acuminate, directed vertically downwards. Legs of *tenth* pair (fig. I. 1 e, 1 h) small, consisting of five segments, widely separated from each other and rising from the external angles of a broad transverse plate, to the anterior surface of which is attached a second plate furnished inferiorly with three processes—a median (stout, angular, compressed) and one on each side (slender, arcuate, and curved forwards in its distal half). The apertures of the seminal coxal pouches (*teste* Verhoeff) appearing as a pair of slits between the plate that bears the appendages and that which bears the processes.

The type and only known species of this genus is the form from Dunedin, New Zealand, described by F. W. Hutton as *Craspedosoma trisetosum* (Ann. & Mag. Nat. Hist. (4) xx. p. 116, 1877).

The characters given above are taken (1) from a female specimen, no doubt Hutton's type, which came from the Otago University Museum, and was received by the British Museum from the Commissioners of the New Zealand Section of the Colonial Exhibition of 1886; (2) from a single damaged male example, probably belonging to the same species as the female, which was captured at Maungatua by Mr. J. V. Jennings.

The male has considerably larger lateral keels than the female, but otherwise the two differ but little apart from genuine sexual features. The head is olive-brown in colour, with the vertex yellow. The antennæ are infusate, flavous at the base. The segments are flavo-olivaceous with a median fuscous band, and fuscous laterally round the base of the tubercles, which are paler. Integument coarsely coriaceous and squamulate. Length 13 millim.

Other characters which will no doubt prove to be of specific value are contained in the generic diagnosis.

*Huttoniella* differs from related forms, so far as general characters as exemplified in the females are concerned, in the features tabulated in the subjoined synopsis (p. 522).

In such characters it differs considerably from *Hetero-*

*chordeuma* as attested by *H. monticola*, Poc. (Max Weber's Zool. Ergeb., Chilopoda &c. p. 342, pl. xix. fig. 14 g, 1894).

The description given of the gonopods of this last-named species must be emended as follows:—The legs of the eighth pair are reduced to a pair of small, unjointed, apically recurved apophyses, proximally contiguous, distally divaricated at an acute angle, and underlying the coxæ of the ninth pair. Legs of ninth pair with long, stout, subcylindrical coxal apophysis, from the base of which rises a slender, curved, apically spatulate, backwardly directed flagellum; the second segment (? trochanter) is relatively small; the third segment (? femur) enlarged, oval and inflated as in *Hutteniella*, but to a lesser degree. The tenth leg is like the ninth in form, although smaller, but the coxal apophysis has no flagellum and the third segment is much smaller, shorter, and only a little inflated. In the original description the ninth and tenth legs were erroneously described as the modified appendages of the seventh segment—that is to say, as the eighth and ninth. Thus the male of *Heterochordeuma* differs greatly from that of *Hutteniella* in the form of the gonopods, as it also does in the nature of the modification affecting the anterior legs.

#### GENUS HENDERSONULA, nov.

Related to *Hutteniella*, but differing in the following particulars:—On the first tergal plate (fig. I. 2) the intermediate tubercles are nearer to the external than to the internal. On the median segments the internal tubercle is the largest of the three. The keels are distinct plate-like processes and not formed by the enlarged external tubercle (fig. I. 2 a). On the posterior segments the three tubercles on each side retain their lateral position, the two internals being widely separated from each other in the middle line (fig. I. 2 b).

Male unknown.

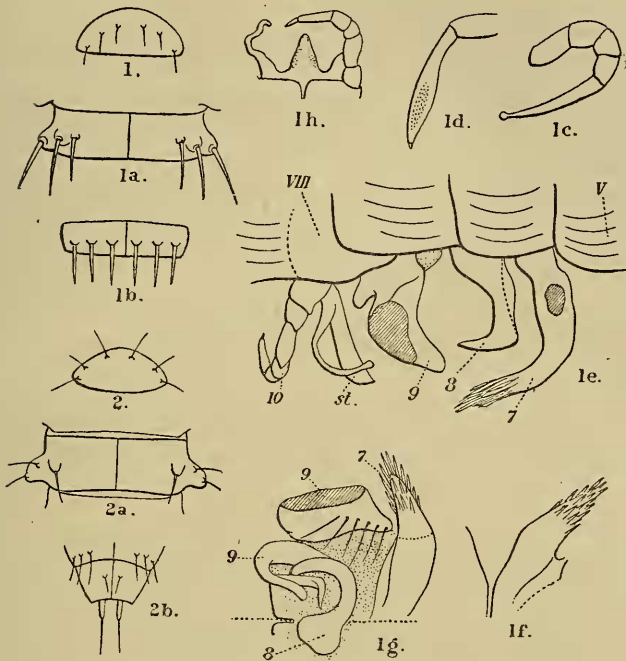
Type *Hendersonula collina*, sp. n.

I have great pleasure in dedicating this genus to Dr. J. R. Henderson, of the Christian College, Madras, who sent a valuable collection of Myriopods from South India to the British Museum some years ago. Amongst these was the type of the species described below—the first species of Chordeumoidea to be discovered in India proper.

#### *Hendersonula collina*, sp. n.

♀.—*Colour* nearly black or very deep brown above, infero-lateral area of segments pale; antennæ blackish, with the

Fig. I.



1. *Huttoniella trisetosa* (Hutton), ♂. First tergal plate.
- 1 a. Ditto. Tergal plate of mid-region of body.
- 1 b. Ditto. Tergal plate towards posterior end.
- 1 c. Ditto. Terminal segments of fourth leg.
- 1 d. Ditto. Distal segment of seventh leg from behind.
- 1 e. Ditto. Lateral view of gonopods: v. and VIII., lateral portion of fifth and eighth segments of body; 7, coxa of seventh leg, the rest of the segments removed; 8, eighth leg; 9, ninth leg, with ovally inflated segment removed; 10, tenth leg, with median and lateral sternal processes (*st.*).
- 1 f. Ditto. Right coxal apophysis of seventh leg from below.
- 1 g. Ditto. Basal portion of seventh, eighth, and ninth legs seen from below and slightly obliquely from the inner side; 7, coxal apophysis of seventh leg; 8, distal extremity of eighth appendage; 9, proximal (? second) segment of ninth appendage with ovally inflated segment removed; 9', coxal or sternal processes of ninth appendage; median ventral line represented by dots.
- 1 h. Ditto. Left leg and sternal apparatus of tenth pair, seen from behind.
2. *Hendersonula collina*, gen. et sp. n., ♀. First tergal plate.
- 2 a. Ditto. Tergal plate of mid-region of body.
- 2 b. Ditto. Last two tergal plates.

basal segment pale; head deep brown, labral region flavous; legs flavous, distally infuscate.

*Antennæ* incrassate, third segment twice as long as the fourth, which is about equal to the sixth in length and to two thirds of the fifth.

*Eyes* consisting of 15 circular separated ocelli, arranged in three vertical series of 3, 6, 6, the short row the innermost of the three.

*Terga* coriaceous, with fine polygonal ornamentation; lateral area of keel-bearing portion furnished with arched striæ, with the concavity upwards. Keels with anterior border convex, posterior concave; anterior angle widely rounded, posterior acute.

Length 6.5 millim., width barely 1 millim.

*Loc.* South India: Kodeikanal, in the Palnai Hills (*J. R. Henderson*).

The females of the four described genera of Heterochordeumidæ, of which *Pocockia* is unknown to me, may be distinguished as follows:—

- |  |                          |
|--|--------------------------|
| a. Segments without keels or lateral tuberculiform prominences . . . . .   | <i>Pocockia</i> .        |
| b. Segments with keels or large lateral tuberculiform prominences.   |                          |
| a <sup>1</sup> . Segments with very wide depressed keels equalling the median area in width and carrying the external setiferous tubercle on their lateral borders; this tubercle remote from the others which remain upon the median tergal area . . . . .                | <i>Heterochordeuma</i> . |
| b <sup>1</sup> . Segments with small, sometimes tuberculiform keels, at least in the mid-region of the body; these keels less than half the width of the median tergal area; tubercles on the middle segments laterally aggregated, the external not remote from the rest. |                          |
| a <sup>2</sup> . On the median segments the internal tubercle the largest; on the posterior segments the tubercles are lateral in position, the internal tubercles being widely separated in the middle line. . . . .  | <i>Hendersonula</i> .    |
| b <sup>2</sup> . On the median segments the external tubercle the largest; on the posterior segments the internal tubercles not lateral but narrowly separated mesially . . . . .  | <i>Huttoniella</i> .     |

#### IULOIDEA.

#### Genus MONGOLIULUS, nov.

♂. Appendages of first pair (fig. II. 1, *app. 1.*, and 1 *a*, p. 524) consisting of five segments only, the first three short,



the fourth very long and stout, the fifth (representing the fifth and sixth in *Paraiulus*) shorter and thinner. Appendages of second pair (fig. II. 1, *app.* II. and *p.*) dwarfed, but normal in form, armed with a long claw, and consisting of five free segments, of which the basal is the trochanter, the elongate coxæ being fused together and with the sternum to constitute a vertical columnar sclerite which bears the penis on its posterior side. Anterior appendages of the sixth segment (=sixth appendage) normal, the posterior appendage (=seventh leg) reduced to an inconspicuous three-jointed conical bud rising from the side of the enlarged sternum and concealed by the infero-lateral edge of the sixth tergal plate; sternal area of the appendage, perhaps containing the coxal element of the latter, produced into a pair of long, antero-posteriorly compressed, immovable, blade-like sclerites, fringed externally and internally with long hairs (fig. II. 1 *b*). Appendages of the seventh segment (eighth and ninth pairs of legs) formed upon the same plan as those of the majority of the North-American species of *Paraiulus* (fig. II. 1 *c*, 1 *d*). Segments 1-7 open below, the sterna not coalesced with the terga.

♀. Legs of the first and second pairs subequal in size, normal in form; no large sclerites developed in connexion with the generative orifices. Segments 1-4 open below, third leg not attached to the fourth segment; inferior angles of first segment projecting inwards like those of the second.

Type *M. coreanus*, Poc.

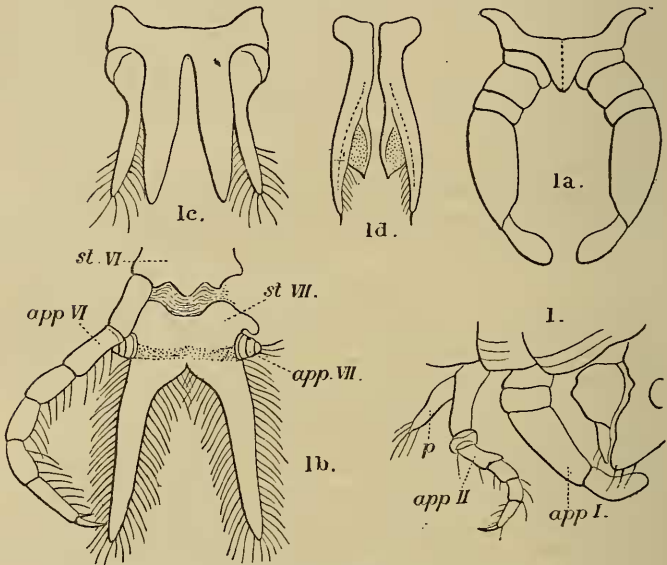
The type species of this genus was assigned to the genus *Paraiulus* (Ann. & Mag. Nat. Hist. (6) xv. p. 365, pl. xi. fig. 12, 1895). It is represented in the British Museum by an adult female and two adult males. Certain specific features not mentioned in the original description are shown in the annexed figures (p. 524).

This very remarkable genus presents a complex of characters distinguishing it from all its nearest allies. The female is nearer that of *Iulus* than of *Paraiulus*, as is testified by the size of the second leg and the absence of genital plates. Its gnathochilarium is like that of *Paraiulus*. It differs from both in the freedom of the sternum of the third leg, which in both *Iulus* and *Paraiulus* is attached to the fourth tergal plate. The inward projection of the inferior angles of the first tergal plate is also characteristic.

The male in the structure of the gnathochilarium and first leg recalls *Paraiulus*, though the suppression of one of the segments of the last-mentioned limb shows departure

from the type found in that genus. In the structure of the second appendage a stage of specialization intermediate between those of *Iulus* and *Paraiulus* is seen; but in the extraordinary modification of the limbs of the seventh pair and their adjacent sternal area, which results in the complete annexation of these structures by the copulatory apparatus, *Mongoliulus* stands alone, so far as I know, in the Chilognatha. As opposed to this specialized feature is the primitive characteristic presented by the freedom of the sternal

Fig. II.



1. *Mongoliulus coreanus*, Poc., ♂. Portion of anterior extremity from the side, showing appendages of first and second pairs (*app. I.* and *II.*) and penis (*p.*) *in situ*.

1 a. Ditto. Appendages and sternum of first pair.

1 b. Ditto. Appendages and sternum of sixth and seventh pairs, the left appendage of the sixth pair removed. *st. VI.* and *app. VI.*, sternum and appendage of sixth pair; *app. VII.*, dwarfed appendage of seventh pair; *st. VII.*, sternum of seventh appendages, with hairy blade-like processes.

1 c. Ditto. Appendages of eighth pair (coleopods).

1 d. Ditto. Appendages of ninth pair (phallopods).

elements of the anterior nine pairs of appendages. To sum up: the male of *Mongoliulus* is an advance upon the male of *Paraiulus* in the structure of the first leg and the almost total suppression of the seventh pair correlated with the modification of the adjacent sternal plate, and stands at a

lower grade of evolution in the freedom from the terga of the sterna bearing the third to seventh appendages and the simpler more archaic construction of the second appendage. The female, on the other hand, except in the form of the first tergite, is less specialized than the female of *Paraiulus*, the freedom of the sternum of the third leg, the absence of genital plates, and the large size of the second legs, all being archaic characteristics. In both sexes, as in *Paraiulus* and *Iulus*, the legs of the first and second pairs belong, I believe, to the first and second segments respectively—or, at all events, whatever view with regard to the matter be correct, no difference is to be found in the three genera mentioned. This opinion differs from those put forward by Brölemann (Ann. Soc. Ent. Fr. 1902, pp. 440–446) and Humbert and de Saussure in 1872, which I believe to be incorrect. Brölemann's criticisms of the view of the Swiss zoologists may be accepted as final. He himself gives the leg-formula for segments 1 to 6 as follows—0, 1, 1, 1, 2, 2—basing it upon the alleged discovery of a limbless sternal plate for the first tergite behind the hypostoma of the gnathochilarium and in front of the sternal plate bearing the legs of the first pair. This sternal plate is of large size and was described and figured by Humbert and Saussure. By Silvestri it was taken to be the hypostoma; but Brölemann found a transverse plate between it and the plate he regards as the mentum, and this he holds to be the hypostoma. On this point, I think, Silvestri was right. The large plate appears to be the hypostoma and to be the sternal element of the posterior region of the head, to the sides of which it is attached. The hypostoma of Brölemann may be a special development arising from the chitinization of the membrane between the hypostoma and the mentum; or it is possible that the four plates of the gnathochilarium in the genus which Brölemann names (1) first sternum, (2) hypostoma, (3) mentum, and (4) promentum, may be the homologues of the four plates in *Cambala* which Silvestri designates (1) basilar, (2) infrabasilar, and (3, 4) the anterior and posterior inframaxillaries (Ann. Mus. Genova, xxxvi. p. 51, fig. 14, 1896). In this connexion the three transverse plates lying behind the stipites in *Paraiulus* may be suggestively compared with the three figured by Cook in his drawing of the gnathochilarium of the male of *Stemmiulus bellus* (Amer. Nat. 1895, pl. xli. fig. 1).

In support of his view Brölemann further alleges the dwarfed appendages of the second pair in the female, at least in one of the species examined by him, namely *P. ellipticus*, to be adherent to the vulval sclerites, lodged in the third

segment, and therefore themselves to belong to the third segment. But in the females of three Central-American species dissected by myself these appendages arise from a small sternal plate separated by a very distinct membranous area from the genital plates. Finally, in the immature or *Pseudoiulus* stage of *Paraiulus aztecus* the arrangement of the appendages is the same as in *Iulus*—that is to say, the first appendages lie between the gnathochilarium and the inward prolongations of the second segment, the second appendages behind the latter and the corresponding area of the third segment, and the third appendages are attached to the sternal plate which is fused to the tergum of the fourth segment. Thus *Iulus* and *Paraiulus* are in agreement in these respects.

Although resembling *Paraiulus* in many striking particulars, *Mongoliulus* differs from that genus in both sexes in certain structural characters which have, in my opinion, a greater taxonomic value than those which serve to distinguish the three so-called families, Iulidæ, Blaniulidæ, and Nemasomidæ (Isobatidæ). If these three groups and the Pæromopidæ retain the rank assigned to them by Cook and Silvestri, consistency will compel the adoption of a section of the same rank, the Mongoliulidæ, for *Mongoliulus*. Even if they be reunited under the one heading Iulidæ, a strong case could still be made out for the recognition of the Mongoliulidæ, especially since further researches into the structure of the various species now included under the names *Paraiulus* and *Ptyoiulus* will no doubt bring to light materials for the splitting of these genera into several additional genera, equivalent to those into which the old genus *Iulus* has been broken up by Berlese and Verhoeff.

The differential characters of the Mongoliulidæ, Paraiulidæ, and Pæromopidæ, as compared with the better-known Iulidæ and related European families, may be tabulated as follows:—

*a.* Mandibles with about ten rows of pectinations.

*a*<sup>1</sup>. Male with first leg enormously developed, forming a five- or six-jointed clasper; second legs dwarfed (? sometimes suppressed) and attached to a sterno-coxal plate showing scarcely a trace of sutures; gnathochilarium with promentum oval, armed with a downwardly directed tooth-like process, the lingual lobes crescentically curved on each side of it; each of the coleopods, consisting of two independently movable processes, subequal in length.

*a*<sup>2</sup>. Male with legs of first pair six-jointed, of second pair, when present, small,

palpiform, four-jointed, the sterno-coxal plate enormous, wide, deeply excavated behind for the reception of the penis; sterna of fourth, fifth, and sixth segments fused to the terga; appendages and sterna of sixth segment normal. Female with sternum and appendages of second segment greatly reduced; genital orifices protected by large chitinous plates, sternum of third segment united to the tergum.....

**Paraiulidæ.**

b<sup>2</sup>. Male with legs of first pair five-jointed, of second pair small but not palpiform, armed with a long claw, consisting of five segments, in contact at the base and rising from the distal extremity of a long cylindrical column, representing the sterno-coxal elements, and not excavated behind for the lodgment of the penis; sterna of fourth, fifth, and sixth segments not fused to terga; anterior appendages of sixth segment normally pediform, the posterior reduced to a conical three-jointed bud concealed by the tergum and attached to the enlarged sternal plate, which is produced inferiorly into a pair of long blade-like excrescences. Female with sternum and appendages of second segment normal, as in *Iulus*; no special sclerites developed in connexion with the genital apertures, sternum of third segment free from tergum.....

**Mongoliulidæ.**

b<sup>1</sup>. Male with first leg short, greatly modified to form a broad, thickly chitinized, at most two-jointed sclerite, the basal segment very short, the distal much longer and, at least sometimes, hooked apically; second legs normal in length, longer than the first, their coxæ separated by a very distinct median suture; gnathochilarium unmodified; promentum triangular, lingual lobes converging distally on each side of it; coleopods consisting of a single sclerite composed of two pieces united by a suture but not independently movable, the anterior (inner) piece much shorter than the posterior (outer). Female with second leg normal in size and structure, its coxæ thickened and strongly chitinized, no distinct genital plates like those of *Paraiulus*.

**Pæromopidæ\*.**

---

\* Apart from its mandibles *Pæromopus*, of which I have seen one male and one female belonging to different species, is much more nearly related to the Iulidæ than to the Paraiulidæ and Mongoliulidæ.

b. Mandible with about four rows of pectinations.

First leg in male not enlarged, slightly or considerably modified; gnathochilarium unmodified. Second leg in female normal; no large genital sclerites .....

Iulidæ, Blaniulidæ,  
Nemasomidæ.

## SPIROBOLOIDEA.

### Genus EUCENTROBOLUS, nov.

*Labral pores* 2 + 2.

*Antennæ* about as long as the uncovered portion of the head, relatively close together, the distance between them about equal to the distance between the edge of the labrum and the summit of the antennal socket, and the distance between the antennal socket and the nearest point on the lateral border of the head equal to half the distance between the two sockets and to three times the diameter of the basal antennal segment. Subocular area of head hollowed longitudinally, so that the inferior edge of the ocular area stands up as a distinct and obtuse ridge. Distance between eyes scarcely equal to  $1\frac{1}{2}$  times their transverse diameter.

First *tergal plate* large, with a row of tubercles along its posterior border, which is slightly elevated. Postsulcal area of all the remaining terga except the last elevated and furnished with a transverse row of blunt tubercular spines from twelve to fifteen in number, irregularly spaced, the intervals between them occupied by smaller tubercles.

*Sterna* transversely ridged.

*Pores* beginning upon the sixth segment, small, in advance of the sulcus, those of the sixth segment on the same level as the rest.

*Anal tergite* produced into a long caudal process.

### *Eucentrobolus tamulus*, sp. n.

♂.—*Colour* black, not shining; legs and antennæ ferruginous.

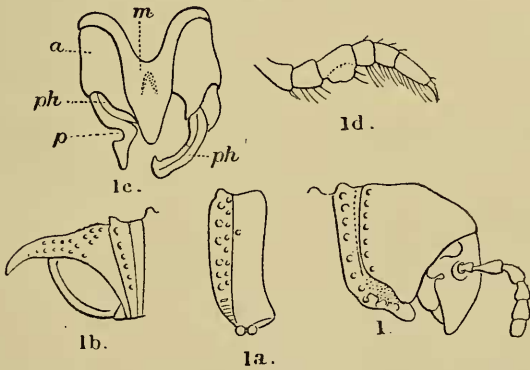
*Head* granularly rugose, transversely grooved inferiorly, the median groove deep above and below, mesially obsolete; forehead lightly depressed.

*Eyes* consisting of about thirty-five ocelli.

First *segment* very large, the widest of the body, coarsely coriaceous, the anterior border lightly concave inferiorly, inferior angle acute but rounded, posterior border somewhat abruptly and obliquely cut away to form the posterior border of the inferior angular termination. Second segment with

its infero-lateral portion tubercular and extending below that of the first, thickened and produced externally and inferiorly, its posterior angle obtusely rounded, its anterior angle acute and underlying the corresponding angle of the first; in addition to the low and irregular tubercles upon the inferior crest the segment is furnished with fifteen large tubercles as well as some smaller ones. Third and fourth segments narrower than the second or fifth, the latter slightly wider than the second. The anterior and median areas of the segments not differentiated, forming a continuous area covered with a reticulation of very fine ridges, which on the anterior part of the inferior portion of the segments run into definite transverse ridges in front and obliquely transverse ridges behind. The posterior elevated portion of the segments coarsely ridged inferiorly below the tubercles; the elevated portion furnished with an anterior row of smaller tubercles in addition to the larger and smaller ones forming the posterior row (fig. III. 1 a).

Fig. III.



1. *Eucentrobolus tamulus*, gen. et sp. n., ♂. Head and first two segments.  
 1 a. Ditto. Segment of mid-region of body.  
 1 b. Ditto. Last two segments.  
 1 c. Ditto. Gonopods from anterior side. *m*, median, *a*, anterior, and *p*, posterior sclerites of coleopod; *ph*, phallopods withdrawn and protruded.  
 1 d. Ditto. Left leg of third pair.

*Anal segment*: tergite closely granular, its median dorsal area longitudinally and bluntly carinate and tubercular; caudal process long, attenuate, projecting horizontally, then sharply curled down at the apex, tubercular. Valves

granular, with strongly compressed margins. Sternite granular, its posterior border convexly rounded (fig. III. 1 *b*).

*Legs* with several stiff setæ on the lower sides of segments 3 to 6 in the anterior portion of the body; the setæ becoming less numerous at the posterior end; basal segment with two setæ, second mostly with one distal seta. Third segment of third and fourth legs in male thickened below (fig. III. 1 *d*).

♀.—Very like the male, except for the presence of a single seta upon the lower side of the segments of the legs. Terga of first and second segments similarly formed.

Number of segments 51.

*Measurements in millimetres*.—♂. Total length 160; width of first segment 12.5, of sixth (excl. tubercles) 11, of median 11, of penultimate segment 8.

*Loc.* South India: Tinnevely (type ♂) (*C. A. Barber*); Trivandrum, in Travancore (*H. Ferguson*).

*Eucentrobolus tamulus* belongs to the same category of species as the form from Madras which I described as *Spirobolus uroceros* (*Journ. Bombay Nat. Hist. Soc.* vii. p. 269, pl. ii. fig. 7, 1892). The two, however, differ so greatly in the sculpturing of the terga that in the absence of intermediate types they may be regarded as generically distinct. For *Spirobolus uroceros* I propose the name *Aulacobolus*. The differential characters of the two genera are given in the table below.

In the sculpturing of the terga these two genera recall *Acanthiulus*, Gervais, but differ from it essentially in the presence of the large and strong caudal process.

*Acanthiulus* was proposed by Gervais (*Ann. Sci. Nat.* (3) i. p. 70, and *Ins. Apt.* iv. p. 173, 1847) for the species from New Guinea described by Le Guillou as *Iulus Blainvillei* (*Bull. Soc. Phil. Paris*, 1841, p. 86). In 1893 (*Ann. & Mag. Nat. Hist.* (6) xi. p. 136) I described a second species of the genus, *A. Murrayi*, from the Aru Islands, and in the following year a third species was established by Daday (*Term. Füzetek*, xvi. p. 101), under the name *Spirobolus dentatus*, from New Guinea, without any notification on the part of the author of similarity between his species and Le Guillou's. The two species come from the same island, and it is impossible to doubt that they are closely related, even if they be not identical. It is to be observed that *Acanthiulus dentatus* differs from the form I described as *Acanthiulus Murrayi* in the position of the pores upon the posterior elevated area of the terga—that is to say, behind the sulcus. In *A. Murrayi* they are distinctly in advance of it, as in *Trigoniulus*. Nothing is said about the position of these organs in the



description of *Blainvillei*, the type of *Acanthiulus*; but the similarity in other particulars between *dentatus* and *Blainvillei* justifies the conclusion that in the latter form also they occupy the abnormal backward position described and figured by Daday in his species. In that case *Murrayi* cannot, strictly speaking, fall into the genus *Acanthiulus*, but must stand apart as the type of another genus, for which the name *Polybunobolus* is proposed. *P. Murrayi* further differs from *dentatus* and *Blainvillei* in the much greater length of the antennæ. This, however, may be a character only of specific value.

The four Oriental genera under discussion may be distinguished as follows:—

- a. Anal segment armed with a long, stout, apically pointed caudal process.
  - a<sup>1</sup>. Posterior area of terga not longitudinally grooved, but furnished with a row of larger and smaller tubercles irregular in size and spacing ..... EUCENTROBOLUS, nov.
  - b<sup>1</sup>. Posterior area of terga longitudinally grooved and furnished with a series of low tubercles equal in size and evenly spaced, situated upon the areas between the grooves ..... AULACOBOLUS, nov.
- b. Anal segment not produced into a caudal process surpassing the valves.
  - a<sup>2</sup>. Pores in front of the sulcus on the median area of the terga; antennæ even in the female much longer than face ..... POLYBUNOBOLUS, nov.
  - b<sup>2</sup>. Pores behind the sulcus on the posterior elevated area of the terga; antennæ short, even in male not longer than face. ACANTHIULUS, Gerv.

COLOBOGNATHA.

? Genus SIPHONOTUS, Brandt.

*Siphonotus brevicornis*, sp. n.

♀.—*Colour* yellow, with two conspicuous fuscous patches on each segment, forming a pair of fuscous bands extending from the first to the last tergal plate, the patches larger and closer together on the anterior than on the posterior terga; hence the median yellow band that separates them is wider posteriorly than anteriorly.

*Head* piriform, longitudinally grooved above, hairy below.

*Antennæ* very short and thick, not longer than head, all the segments much wider than long.

*Terga* finely rugose, with faint longitudinal striæ; pleuræ coriaceous.

Number of segments 64.

Length 23 millim., width about 1 millim.

Loc. Narre Warren, in S. Gippsland, Victoria (*Prof. Baldwin Spencer*).

One female specimen. A more detailed examination upon fresh material may prove this species to be generically distinct from *Siphonotus*. No examination of the gnathochilarium was made.

LII.—*Diagnoses of Four new Species of Barbus from the Nile.* By G. A. BOULENGER, F.R.S.

A STUDY of the very numerous small specimens of the genus *Barbus*, mostly young of the larger species, collected by Mr. Loat in the Nile, has revealed the existence of four undescribed species, of which diagnoses are here given in anticipation of the descriptions and figures which will appear in the forthcoming work on the Fishes of the Nile.

*Barbus neglectus.*

D. III 8. A. III 5. Sq. 26–30  $\frac{3\frac{1}{2}-4\frac{1}{2}}{3\frac{1}{2}}$ .

Depth of body 3 to  $3\frac{2}{3}$  times in total length, length of head 4 to  $4\frac{1}{3}$  times. Diameter of eye  $2\frac{1}{2}$  to 3 times in length of head; two barbels on each side, anterior about  $\frac{1}{2}$  diameter of eye, posterior as long as eye or a little shorter. Origin of dorsal nearer end of snout than root of caudal; last simple ray not ossified. Ventrals below or a little behind origin of dorsal. Caudal peduncle 1 to  $1\frac{1}{3}$  as long as deep. 2 or  $2\frac{1}{2}$  scales between lateral line and ventral fin, 12 round caudal peduncle. Yellowish, with a broad silvery lateral band.

Total length 54 millim.

Nile Delta and Luxor.

*Barbus miolepis.*

D. III 7–8. A. III 5. Sq. 24–25  $\frac{4\frac{1}{2}}{3\frac{1}{2}-4\frac{1}{2}}$ .

Depth of body 3 to  $3\frac{1}{2}$  times in total length, length of head  $3\frac{1}{2}$  to 4 times. Diameter of eye  $2\frac{1}{2}$  to  $3\frac{1}{3}$  times in length of head; barbels two on each side, anterior a little shorter than eye, posterior as long as eye or a little longer. Origin